

WHAT IS CLAIMED IS:

1        1.        A head driving device of a liquid ejecting apparatus, comprising:  
2                    a liquid ejecting head, formed with a nozzle orifice from which a liquid  
3                    droplet is ejected;  
4                    a driving signal generator, generating a driving signal;  
5                    a pressure generating element, applying pressure to liquid based on  
6                    the driving signal for ejecting the liquid droplet;  
7                    a charge element, charged at a reference voltage lower than a drive  
8                    voltage for driving the pressure generating element, and applying a bias  
9                    voltage to the pressure generating element; and  
10                  a discharge circuit, discharging a charge on the charge element to a  
11                  ground when a voltage of the charge on the charge element is equal to or  
12                  higher than a first voltage which is higher than the bias voltage.

1        2.        The head driving device as set forth in claim 1, wherein the discharge  
2                  circuit includes a switching element connected between the charge element  
3                  and the ground; and  
4                  wherein the switching element is turned on when the voltage of the  
5                  charge on the charge element is equal to or higher than the first voltage.

1        3.        The head driving device as set forth in claim 2, wherein the switching  
2                  element includes a transistor, the base of which is connected to a reference  
3                  voltage source, the emitter of which is connected to the charge element and  
4                  the collector of which is grounded.

1       4.       The head driving device as set forth in claim 3, wherein a current  
2       limiter resistor is connected in series between the collector of the charge  
3       element and the ground.

1       5.       The head driving device as set forth in claim 1, further comprising an  
2       abnormal voltage detector, outputting a detection signal when the voltage of  
3       the charge on the charge element reaches a second voltage higher than the  
4       first voltage.

1       6.       The head driving device as set forth in claim 3, wherein the transistor  
2       is a FET.

1       7.       The head driving device as set forth in claim 1, wherein the pressure  
2       generating element is a piezoelectric element.

1       8.       The head driving device as set forth in claim 1, wherein the charge  
2       element is a capacitor

1       9.       A method of discharging a charge on a charge element of a head  
2       driving device of a liquid ejecting head, comprising the steps of:  
3               ejecting a liquid droplets based on a driving signal by applying  
4       pressure to liquid;  
5               charging a charge element at a reference voltage lower than a drive  
6       voltage for ejecting the liquid droplet;  
7               applying a bias voltage to a pressure generating element by the

8 charge on the charge element; and  
9 discharging the charge on the charge element to a ground when a  
10 voltage of the charge on the charge element is equal to or higher than a first  
11 voltage which is higher than the bias voltage.

1 10. The method as set forth in claim 9, further comprising the steps of:  
2 detecting whether the voltage of the charge on the charge element  
3 reaches a second voltage higher than the first voltage; and  
4 outputting a detection signal based on a result of the detecting step.